Worksheet 2 Writing and following algorithms

Task 1

1. What will be the output from the algorithm below if the user inputs "Hi, Jo!"

    Explain briefly the purpose of the algorithm.

```
function encrypt(message, shift)
   message = lowercase(message)
   encryptedMessage = ""
   for x in message
       if x in "abcdefghijklmnopqrstuvwxyz"
           num = ord(x)                    # convert to ASCII value
           num = num + shift
           if num > ord("z")               # wrap if necessary
               num = num - 26
           endif
           char = chr(num)                 # convert back to character
           encryptedMessage = encryptedMessage + char
       else
           encryptedMessage = encryptedMessage + x
       endif
   next x
   return encryptedMessage
endfunction

# main program
shift = 3
msg = input("Enter your message: ")
encryptedMessage = encrypt(msg, shift)
print("The encrypyted message is: ", encryptedMessage)
```

Task 2

2. An array marks is defined as follows: marks[15, 18, 14, 9, 16, 12, 10]

    A pseudocode algorithm for an algorithm is given below.

```
items = len(marks)
for i = 0 to items - 2
    for j = 0 to (items - i - 2)
        if marks[j] > marks[j+1]
            temp = marks[j]
            marks[j] = marks[j+1]
            marks[j+1] = temp
        endif
    next j
next i
print (marks)
```

    One pass is made through the outer loop of the algorithm.

    Complete the trace table below to show how the contents of the array changes.

items	i	j	temp	marks [0]	[1]	[2]	[3]	[4]	[5]	[6]
				15	18	14	9	16	12	10

What is the name of the algorithm?

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3. Complete the trace table to determine the purpose of the following algorithm.
   Test it with input 11 and 5.

```
x = input ("Enter the first integer: ")
y = input ("Enter the second integer: ")
z = 0
while x > 0
    if x mod 2 == 1 then
        z = z + y
    endif
    x = x div 2
    y = y * 2
endwhile
print ("Answer =", z)
```

x	y	z	x> 0	x mod 2 == 1	output
11	5	0	True	True	